

MR1683-507
Serial Number: 16716,550
Reply to Official Action dated 5 April 2004

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listing of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently amended) ~~A~~ A method for forming copper interconnects including an oxygen-removing pre-process, the method comprising the steps of:

- a. providing a solvent;
- b. heating the solvent to a boil in an open container and maintaining the boiling condition for a predetermined time period to remove dissolved oxygen therefrom;

- c. cooling the solvent;

- d. forming a reaction solution by mixing hydrofluoric acid and cupric sulfate with the cooled solvent;

- e. preparing a substrate with a Ti metal displacement layer;

- f. immersing the prepared substrate in the reaction solution to carry out a displacement process for forming a copper film layer.

~~for copper interconnect grown by electrochemical displacement~~

MR1683-507
Serial Number: 10-716,550
Reply to Official Action dated 5 April 2004

~~deposition is to remove the oxygen in the reaction solution before displacement and deposition on copper film (conducting wire such that the copper film/conducting wire is grown and has a lower electric resistance.~~

Claim 2 (Cancelled).

Claim 3 (Currently amended) ~~The oxygen-removing pre-process method as claimed in claim [[2]]~~ wherein the oxygen in the reaction solution is removed by being boiled step of maintaining the boiling condition for a predetermined time includes the step of boiling the solvent for two minutes.

Claim 4 (Currently amended) ~~The oxygen-removing pre-process method as claimed in claim 3, wherein the reaction solution is fastated step of cooling includes covering the container to prevent the ambient oxygen in the air from being dissolved into the reaction solution solvent during cooling.~~

Claim 5 (Currently amended) ~~The oxygen-removing pre-process method as claimed in claim 4, wherein the step of a container for receiving the reaction solution is closed to insulate the reaction solution received in the container covering the container includes the step of covering the container with polypropylene film to isolate the solvent from exposure to air.~~

MK1633-307
Serial Number: 10716550
Reply to Official Action dated 5 April 2004

Claim 6 (Currently amended) The method as claimed in claim 1, wherein the step of providing a solvent includes the step of providing deionized water. An oxygen removing pre-process for electrochemical displacement deposition removing oxygen in the reaction solution by boiling, the reaction solution insulated to prevent the oxygen in the air from being dissolved into the reaction solution during cooling, the reaction solution mixed with liquid and provided to the electrochemical displacement deposition for reducing the electric resistance of the grown copper.

Claim 7 (Currently amended) The oxygen removing pre-process method as claimed in claim 6, wherein the step of forming a reaction solution is mixed with deionized water includes mixing forty-milliliters of a buffered hydrofluoric acid and four-grams of cupric sulphate mixed in one liter of the deionized water.

Claims 8 - 9 (Cancelled).

Claim 10 (Currently amended) The method oxygen removing pre-process as claimed in claim 6, wherein the step of cooling includes the step of cooling the solvent reaction solution-cools for forty minutes.

MRJ633-537
Serial Number: 10,716,553
Reply to Official Action dated 5 April 2004

Claims 11 - 12 (Cancelled).

Claim 13 (Currently amended) The ~~oxygen-removing pre-process~~
method as claimed in claim 6 1, wherein the step of forming a Ti metal
displacement layer is previously formed on the wafer by includes forming the Ti
metal displacement layer with a sputtering system.

Claim 14 (Currently amended) The ~~oxygen-removing pre-process~~
method as claimed in claim 13, wherein the Ti metal displacement layer formed
has a thickness for of 3000 Å.